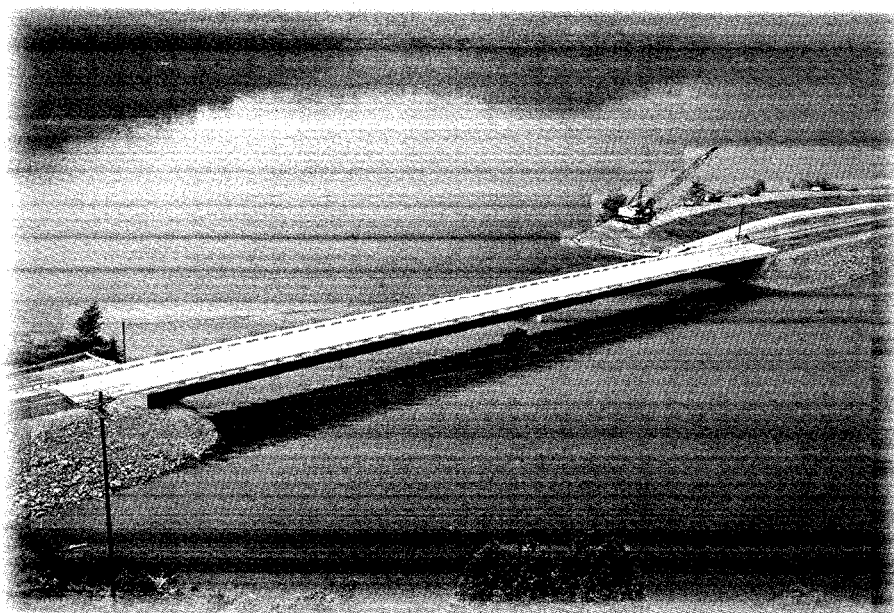




STRUCTURES

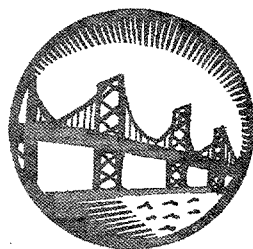
New Program Promotes Innovative Bridge Materials and Technologies

The Innovative Bridge Research and Construction (IBRC) Program provides direction and funding to accelerate the adoption of innovative materials—such as high-performance concrete and steel, aluminum, and fiber-reinforced polymers—and technologies for bridge repair and construction. This 6-year program, administered by FHWA's Office of Bridge Technology, promotes the use of innovative materials and technologies on bridges to reduce maintenance and life-cycle costs, ease construction time and traffic congestion, and increase the ability of bridges to withstand natural disasters, including alternatives for seismic retrofitting. The program also promotes close partnerships with States, localities, and industry in meeting its goals.



Using high-performance concrete and steel, aluminum, and fiber-reinforced polymer can reduce maintenance and life-cycle costs, ease construction time and traffic congestion, and increase the ability of bridges to withstand natural disasters.

The Transportation Equity Act of the 21st Century (TEA-21) funds IBRC technology deployment through research, development, and technology transfer activities and through grants to State DOTs for repair and construction. The total annual grant program ranges from \$10 to \$20 million. DOTs can



nominate bridge projects and use IBRC funding to help defray the cost of incorporating innovative materials in their bridge projects. An important component of IBRC is the opportunity to establish design and evaluation criteria for innovative materials and technologies.

The FY 1998-1999 solicitation for candidate projects attracted 111 nominations. Sixty projects were identified as well-qualified for funding. The FY 2000 solicitation was published April 1, 1999. For information on the IBRC program and projects funded, visit www.fhwa.dot.gov/bridge.—

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RESEARCH & TECHNOLOGY TRANSPORTER

The *Research & Technology Transporter* is intended to transmit current research and technology accomplishments and technical assistance information. It is issued under FHWA's Research and Technology Program. Editorial offices are housed at the Turner-Fairbank Highway Research Center. Comments should be sent to the editor at the address below. Field offices may submit articles for publication in the *Transporter* to the appropriate Research & Technology Coordinating Group (RTCG) Chairperson listed below. The *Transporter* is distributed to FHWA's Washington Headquarters and field offices, State highway agencies, and selected associations having direct involvement with FHWA and its highway research mission. To subscribe, please send your subscription request to Judy Dakin at the address below, or send e-mail to judy.dakin@fhwa.dot.gov.

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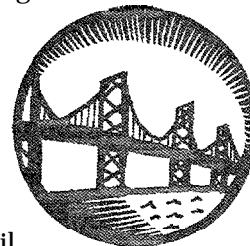
Humbolt Stiffness Gauge Merits NOVA Award



Director of RD&T Dennis Judycki, Mike Adams, Al Dimillio, Paul Teng, and (back) Carl Ealy proudly display the NOVA award.

The Construction Innovation Forum's Annual NOVA Award was given out in March to recognize the Humboldt Stiffness Gauge (HSG), a device developed by FHWA research engineer Al DiMillio, along with Frank Berkman of BBN, Inc., Chuck Nelson of CNA, Inc., and Dennis Burgess of the Humbolt Manufacturing Co. The HSG is a field instrument used to measure soil stiffness and soil modulus without digging into or destroying the existing soil. It measures soil stiffness in about a minute and provides more complete and accurate information than was available previously. Using the HSG eliminates the extra design

time required for a construction project when soil modulus is unknown. It also saves workers from having to compact soil more than necessary.



The HSG is derived from an Army device used to detect buried land mines. The Advanced Research Programs Administration of the Department of Defense funded the initial study under their Technology

Reinvestment Program.

Compacted soil is an essential element of highway, airport, building, sewer, and bridge construction.—

Al Dimillio

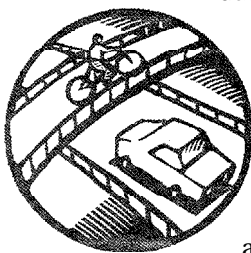
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SAFETY

Students learn About Pedestrians and Bicyclists

Every year approximately 6,000 pedestrians and bicyclists are killed in crashes with vehicles. These crashes are the leading cause of death for persons from ages 1 to 44. FHWA's Office of Safety R&D has developed a comprehensive university graduate course on pedestrian and bicyclists for transportation planning and engineering students.



The course material teaches future transportation professionals how to integrate pedestrian and bicycle accommodations into the planning and design of the transportation system. The university course covers an extensive range of issues

in non-motorized transportation design, which includes pedestrian and bicycle crash types and countermeasures, pedestrian accommodation at intersections, traffic calming techniques, and bicycle facility design.

In March, 26 professors who develop and teach transportation planning and engineering attended a forum about the course.

The University Pedestrian and Bicyclist Graduate Course was well received. All the professors indicated that they would integrate the course materials into their curriculum, and some indicated they would offer it as a stand alone course. A second forum is being planned for early 2000.—

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The new course will instruct students on all aspects of bicycle and pedestrian safety and design.



Twenty-six professors **attended** the first forum on the University Pedestrian and Bicycle Graduate Course held at the University of Maryland.

Workshops Promote ATMS Design Handbook

The Human Centered Systems Team of RD&T is offering a series of hands-on workshops to promote the recently completed *Human Factors Handbook for Advanced Traffic Management System (ATMS) Design*. The handbook provides guidance to Traffic Management Center (TMC) design teams on efficient and effective ways to design TMCs and concentrates on design elements of the TMC related to human performance. The handbook provides design guidelines in the areas of

human error, human performance, job design, anthropometry and design, display devices, controls and input devices, the work space, the user-computer interface, user aids, and presenting data.

These full-day workshops will be held in various locations around the country this summer. They are aimed at members of the public and private sector. The workshops will

introduce the development, organization, contents, and use of the handbook. Presenters

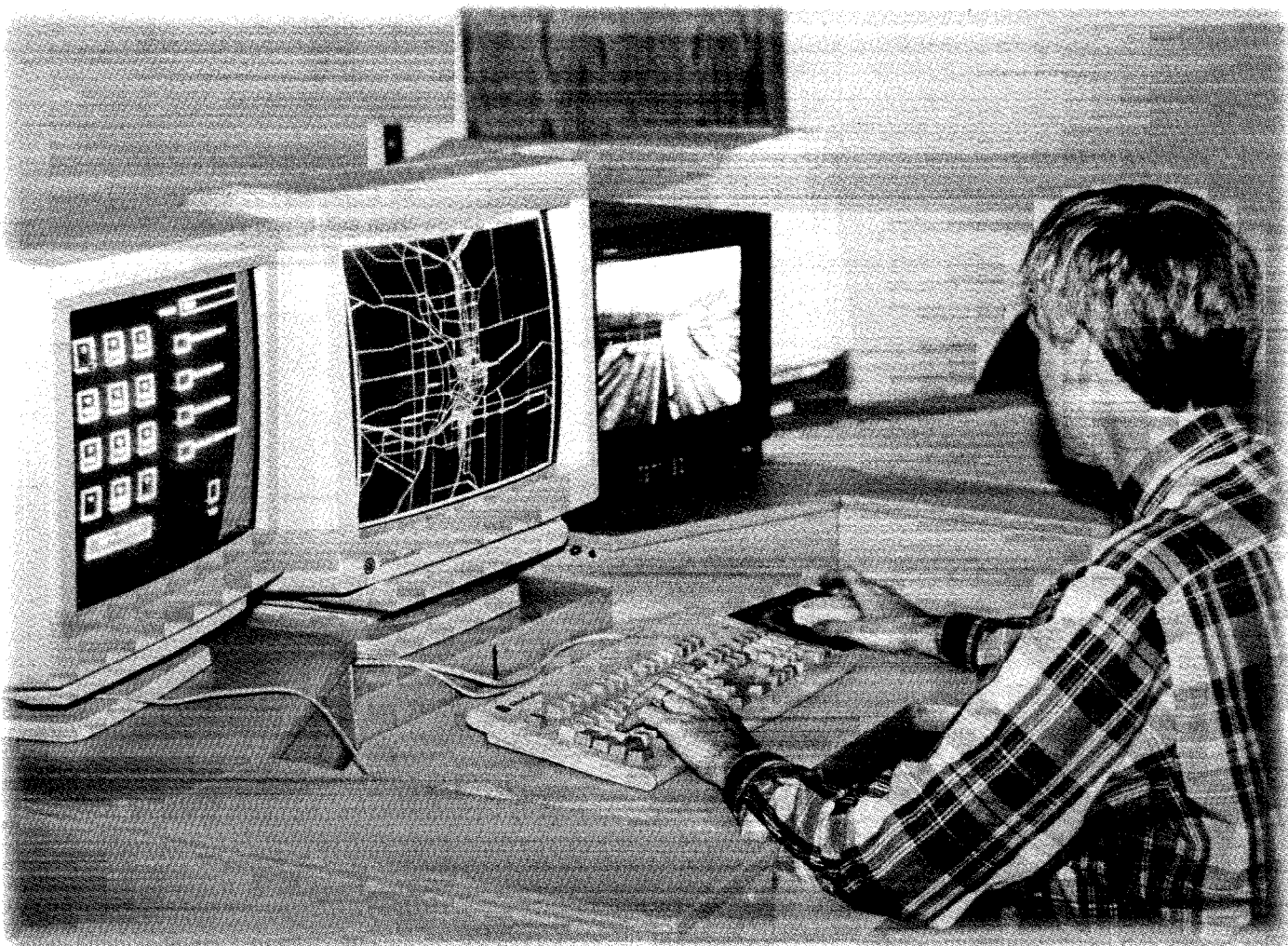
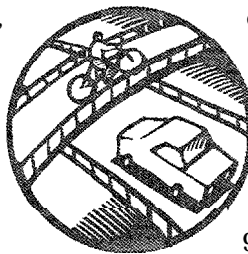
explain how to apply the handbook guidelines and how to use the handbook to tackle several real-world problems. Copies of the handbook (FHWA-JPO-99-042) will be available

later this spring.—

Mark Robinson

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The new workshops provide useful guidelines for designing Traffic Management Centers.

NHI Training Update

First 20 NHI Instructors Certified

The National Highway Institute is proud to present the list of the first 20 “Certified NHI Instructors.” The six-months-old Instructor Certification Program is designed to ensure consistent instructional quality and encourage the use of “learner-centered” training methods particularly suitable for adult learners. NHI expects to have all its instructors certified within three years.

To celebrate this important milestone, NHI wants to publish the names of its newly-certified instructors, called “champions of professional development” by Joseph S. Toole, the director of FHWA’s Office of Professional Development (OPD). Here are the first 20 champions:

Daniel P. Adley, KTA Tater, Pittsburgh, PA
Brenda F. Armstead, FHWA Headquarters, Office of Civil Rights
Larry Arneson, FHWA, Western Resource Center,
John Ballantyne, FHWA, Kentucky Division Office
Jerry DiMaggio, FHWA Headquarters, Office of Bridge Technology
Gary Euler, PB Farradyne, Rockville, MD
Bill Fitzgerald Eastern Resource Center
Pat Hannigan, Goble Rausche Likens & Associates, Arlington heights, IL
Raymond A. Hurtle, Michael Baker, Jr., Inc, Coraopolis, PA
Tom Horan, PB Farradyne, Glenmont, CA
Joseph Krolak, Greenhorne & O’Mara, Greenbelt, MD
Dennis D. Lee, FHWA Midwestern Resource Center
Steve Lockwood PB Farradyne, Rockville, MD
Pamela P. Marston, FHWA/FTA Los Angeles Metropolitan Office
Humberto Martinez, FHWA, Office of Civil Rights, Fort Worth, Texas
Johnny Morris, Owen Ayres & Associates, Fort Collins, CO
Dick Powers, FHWA Headquarters, Office of Highway Safety Infrastructure
John Tidwell, University of Tennessee Transportation Center
Steven Toillion, FHWA Midwestern Resource Center
Arlo Waddoups, FHWA, Western Resource Center

To learn more about the Instructor Certification Program, please check the next issue of the Transporter, visit NHI’s Web site, or contact NHI’s Instructor Certification Program Manager Ilse van Goth at (703) 235-0529, ilse.vangoth@fhwa.dot.gov

Software is Expert for Crash Data Collection

Getting accurate and consistent crash data is a key element to improving highway safety. Software has been developed by FHWA's Safety Management Team of RD&T that increases the accuracy and consistency of data recorded by police after a crash. Expert system software was designed and developed to provide better data for three safety elements:

- **Seat belt use:** The system determines if an occupant was wearing a seat belt during a crash.
- **Vehicle damage rating:** The system collects data needed to estimate the type and amount of vehicle damage.
- **Roadside barrier problem identification:** In a barrier crash, the system collects data required

to identify the barrier type and the problems associated with that barrier type.

Expert knowledge is incorporated in the software. The software can query the police for relevant data based on the circumstances of a particular crash. The expert systems intelligently assign a value to a crash data element and reach conclusions that human experts would, based on that same crash evidence. Police can use the expert systems via a seamless interface with a State police report data collection system.

The software was successfully tested in Iowa. Police officers felt the software was easy to use and fast—it only took about 2 minutes per expert system to collect the data.

The final report on the software is titled *Expert Systems for Crash Data*



Police in Iowa tested the software and felt it was easy to use and fast—it only took about 2 minutes per expert system to collect the data.

Collection. It is available at www.tfhr.gov. A technical brief (FHWA-RD-99-052) and an unpublished Transportation Research Board (TRB) paper are also available by contacting the following.—
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ENVIRONMENT

Striving for A "Sound" Environment

In order to prepare highway engineers to better mitigate noise pollution, a new video has been produced titled *Acoustics and Your Environment-The Basics of Sound and Highway Traffic Noise*. The video was created for FHWA by the Volpe National Transportation Systems Center Acoustics Facility. It is an educational tool that presents the fundamentals of sound and highway traffic noise. The video thoroughly explains traffic noise analysis for residents immediately adjacent to a proposed noise barrier.

The video is approximately 48 minutes long and has two parts. Part 1 introduces the basics of sound, including:

- Sound waves.
- Frequency.
- Noise.
- Sound pressure level.
- Sound perception.
- Noise descriptors.

Part 2 discusses the basics of highway traffic noise, including:

- Highway traffic noise.
- Source/path/receiver.
- Sound sources.



- Noise effects.
- Sound propagation.

A copy of the video and the script for the video was distributed to FHWA field offices and State DOTs. The video is available by calling FHWA at (202) 366-2078, the Volpe Center at (617) 494-2372, or NTIS at (800) 553-NTIS (video # AVA20426VNB1).—
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PAVEMENTS

New Course on Superpave is Now Available

A new undergraduate course on Superpave is now available through the FHWA Research and Technology Report Center. The course introduces the Superpave mix design system to college students majoring in civil engineering. It can be used as a supplement to the asphalt concrete segment of the traditional undergraduate course in civil engineering materials or pavements.

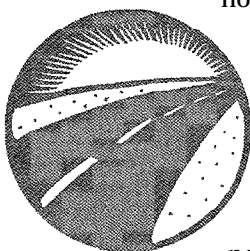
The university course materials include two 50-minute lectures for sophomore-level students and

twelve 50-minute lectures for juniors. The course information is being made available on a CD-ROM. The class lectures are in Powerpoint format. Instructor's notes, a laboratory instructor's guide, and student's notes, as well as student homework problems, are included. The CD includes a Powerpoint viewer, so software purchase is not necessary.

The CD-ROM is being distributed directly to the AASHTO Subcommittee on Materials, FHWA Local Technical Assistance Program

Centers, the Superpave Centers, and to FHWA headquarters and field staff. The FHWA field offices will be asked to distribute the course to State highway agencies and to work with the states to encourage universities and colleges to include the course materials in their curriculums.

To order the Hot **Mix Asphalt for the Undergraduate** CD-ROM (Publication No. FHWA-RD-99-073), contact the FHWA Research and Technology Report Center at (301) 577-0818, or fax (301) 577-1421.—
Lee Gallivan
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The Hot Mix Asphalt for the Undergraduate course introduces the Superpave mix design system to college students majoring in civil engineering.

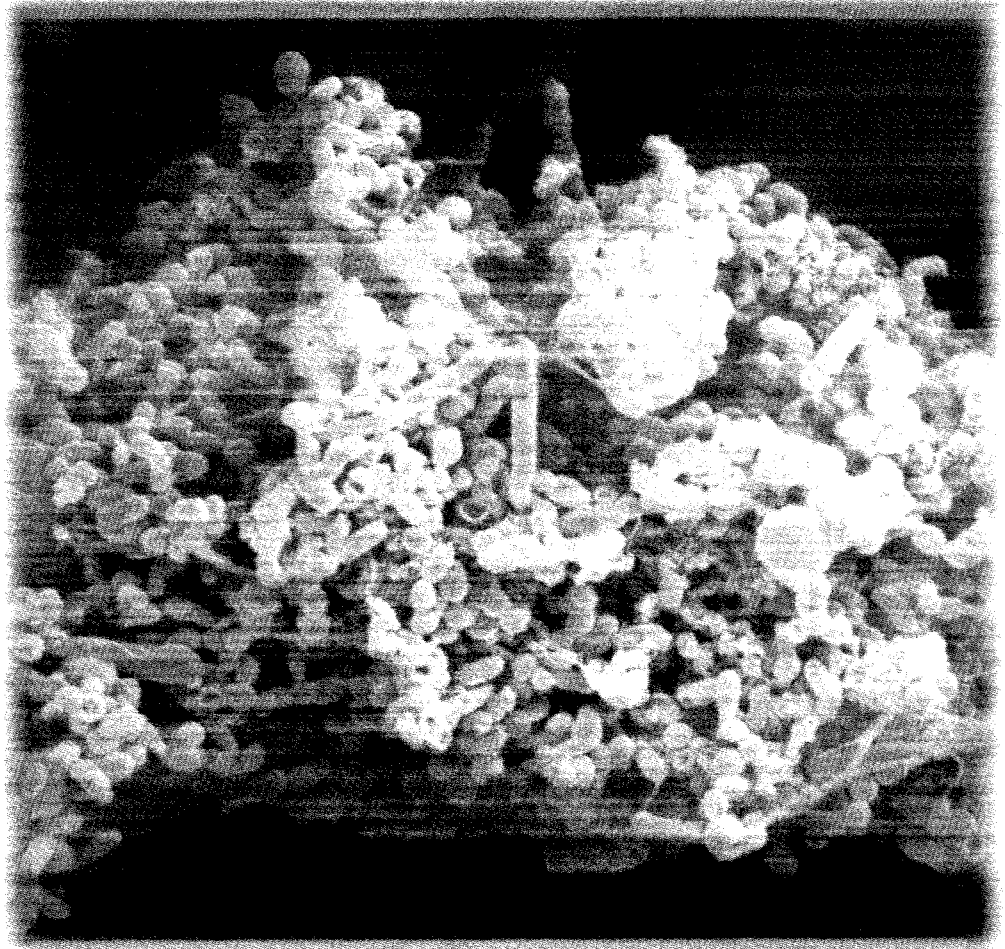
New Deicers Produced From Cheese Whey

A study by FHWA's Asphalt Team has revealed a new process to develop low-cost calcium magnesium acetate (CMA) deicers from cheap feed stocks such as cheese whey. The use of CMA deicer can help maximize the efficiency of winter maintenance operations and help preserve both the environment and the Nation's highway infrastructure.

CMA is a mixture of calcium acetate and magnesium acetate and has a deicing ability comparable to that of salt. Unlike salt, CMA is noncorrosive to vehicles, is not harmful to highway concrete and vegetation, and has no significant health or environmental concerns. Unlike commercially available CMA, which is made from glacial acetic acid and dolomitic lime or limestone, CMA from cheese whey can be produced at highly competitive prices.

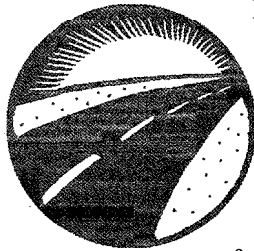
The new process calls for the fermentation of cheese whey in a fibrous bed reactor to produce acetate from lactose. The acetic acid is then extracted, recovered, and separated from the fermentation broth.

Acetate can be efficiently produced from whey (lactose) using an anaerobic mixed culture of homolactic and homoacetic bacteria. Production



Scanning electron micrograph of *C. formicoaceticum* (long rods) and *L. lactis* (cocci) immobilized on the fiber surface in the fibrous bed reactor.

of acetate from currently unused liquid whey could provide 0.77 million tonnes (-1.7 billion pounds) per year of low-cost CMA and potassium acetate (KA) for highway and airport runway deicing materials.



Deicing tests have shown that CMA samples from fermentation and extraction have an equal or slightly better ice penetration rate than that of commercial CMA. Cost analysis

shows that CMA can be produced at a production cost of \$224 to \$260 /tonne, less than 30 percent of the current market price for commercial CMA.

The results of this study are fully documented in a new report (FHWA-RD-98-174) titled *Calcium Magnesium Acetate at Lower Production Cost: Production of CMA Deicer from Cheese Whey*.—

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OPERATIONS

CD-ROM Presents ITS Awareness

A multimedia interactive CD-ROM, *Intelligent Transportation Systems Awareness*, has been developed by FHWA's Office of Operations Technology Services. The CD offers current information in an interactive format. It is based on the Intelligent Transportation Systems (ITS) Professional Capacity Building (PCB) instructor-led ITS Awareness Seminar (FHWA Course #13601). The seminar has been presented to more than two thousand participants.

Version one of the *ITS Awareness* CD-ROM was previewed at the Transportation Research Board annual meeting in January 1999

and copies were disseminated to FHWA field offices. Version two is available, and includes the following four modules:

- Module 1--What Are *Intelligent Transportation Systems*?
- Module 2--Success *Stories*.
- Module 3--*Strategic Considerations*.
- Module 4--*Planning and Intelligent Transportation Systems*.

The *ITS Awareness* CD-ROM, a self-paced interactive learning tool, contains video clips, narration, review questions, and

hyperlinks to ITS websites, which provides the user with state-of-the-practice information on ITS.

The *ITS Awareness* CD-ROM was given out at the ITS America annual meeting in April and distributed to FHWA and Federal Transit Administration field offices. Copies are available for individuals, professional associations, and State and local agencies until supplies are depleted. For a copy of the *ITS Awareness* CD-ROM, please contact:

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